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EXAMINER	
MOYER, DALE S	

ART UNIT	PAPER NUMBER
3664	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,116	SAKATA ET AL.	
	Examiner	Art Unit	
	Dale Moyer	3664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1. This final office action is in response to the applicants' amendment received by the United States Patent and Trademark Office on 25 August 2010.

2. Claims 1-25 have been presented in the application, of which, claims 1-13 and 15-22 are currently amended, claims 14 and 22-23 were previously presented, and claims 24-25 are new. Accordingly, pending claims 1-25 are addressed herein.

Response to Arguments

3. In response to the applicants amendments and/or arguments, the rejections to claims 1-4, 6, 8-11 and 13 under 35 U.S.C. § 112, second paragraph for being indefinite have been withdrawn.

4. The applicants' arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-6, 8-10, 13-14 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Genov '670 (United States Patent No. 6,085,670).

Regarding claim 1, Genov '670 teaches a transporting apparatus for transporting a plate, the apparatus comprising: a pair of upright support members (Figs.

24 and 25, element 114) standing at a predetermined interval; at least one horizontal support table (Figs. 22-25, elements 112 and 212) liftably cantilevered on the pair of upright support members; a tilt adjuster (Figs. 24 and 25, elements 214, 314 and 414) including a tilt table (Figs. 22, 24 and 25, element 312) formed on the horizontal support table; a lift driver (Figs. 24 and 25, element 116) for lifting the horizontal support table vertically; a robot (Fig. 22, element 100) placed on the tilt table and having horizontally rotating arms for taking up and transporting the plate (column 4, lines 27-39; column 7, line 48 through column 8, line 29; column 8, lines 38-47).

It is noted that Genov '670 teaches that the disclosed transporting apparatus is capable of correcting z-axis misalignments caused by a deflection of the robotic arm when heavily loaded with substrate (column 1, line 66 through column 2, line 4).

Further, it is noted that the transporting apparatus is capable of lifting and tilting both the horizontal support table and the tilt table. Additionally, the transporting apparatus is capable of tilting the tilt table while holding the horizontal support table in a lifted horizontal (not tilted) position.

Genov '670 does not explicitly teach a deflection compensator which controls the transport apparatus of Figs. 23-25.

However, it is noted that controllers (applicants' 'deflection compensator') for controlling a tilt angle of a platform to compensate for misalignments are very well known in the art (see for example, Figs.23-24, element 96 of incorporated application 08/788,898 now US Patent No. 5,789,890; Genov '670 column 2, lines 5-15).

It would have been obvious to a person having ordinary skill in the art at the time of the applicants' invention to combine the teachings of Genov '670 with what was very well known in the art. That is, it would have been obvious to combine the transporting apparatus with a well known controller for the purpose of controlling lifting and tilting of the robotic arm to correct for misalignments.

Regarding claim 2, Genov '670 teaches the transporting apparatus as applied to claim 1 above, wherein the horizontally rotating arms are extendable between the pair of upright support members.

It is noted that the horizontally rotating arms are extendable in a direction that is orthogonal to the axis of rotation (Z axis) as seen in Fig. 22. Thus, the arms are extendable between the pair of upright supports. That is, the arms are extendable in +/- X direction and/or a +/- Y direction.

Regarding claim 3, Genov '670 teaches the transporting apparatus as applied to claim 2 above, wherein the tilt adjuster changes an angle of the robot placed on the horizontal support table with respect to a horizontal plane (rotatable about the X axis and rotatable about the Y axis, see Fig. 23).

Regarding claim 4, Genov '670 teaches the transporting apparatus as applied to claim 3 above, wherein the deflection compensator compensates for a deflected amount in a vertical direction of the rotating arm and a deflected amount of end effectors provided at respective ends of the rotating arms for taking up and transporting the plate (see incorporated reference Genov 5,789,890 at Fig. 32, element dα; column 21, lines 26-34).

Regarding claim 5, Genov '670 teaches the transporting apparatus as applied to claim 4 above, wherein the deflection compensator compensates for the deflected amounts of said rotating arms and said end effectors when the end effectors take up the plate (compensating for deflections due to the weight of a substrate carried by the end effector, see column 1, line 66 through column 2, line 4).

Regarding claim 6, Genov '670 teaches the transporting apparatus as applied to claim 5 above, wherein the deflection compensator compensates for the deflected amounts of the rotating arms and the end effectors take up the plate (compensating for deflections due to the weight of a substrate carried by the end effector, see column 1, line 66 through column 2, line 4).

Regarding claim 8, Genov '670 teaches that the z-axis platform is tiltable and liftable and that adjustment of z-axis is useful when transporting large substrate which may deflect the robot arm downward due to the substrate weight (column 1, line 66 through column 2, line 4).

Regarding claim 9, Genov '670 teaches the transporting apparatus as applied to claim 4 above, wherein the deflection compensator comprises a compensation controller for controlling the tilt adjuster to tilt the robot placed on the horizontal support table to one of raise the end effectors to compensate deflection of one of the rotating arms and the end effectors (column 8, lines 8-29).

Regarding claim 10, Genov '670 teaches the transporting apparatus as applied to claim 4 above, wherein the deflection compensator comprises a compensation controller for controlling the lift driver and tilt adjuster for raising the horizontal support

table to compensate deflection of one of the rotating arms and the end effectors (column 7, line 58 through column 8, line 29).

Regarding claim 13, Genov '670 teaches the transporting apparatus as applied to claim 1 above, further comprising a moving device for moving the pair of upright support members horizontally (Figs. 24 and 25, element 116; tilt).

Regarding claim 14, Genov '670 teaches the transporting apparatus as applied to claim 1 above, further comprising a beam for fixedly coupling the top portions of the pair of upright support members while the pair of upright support members is held in parallel (Figs. 22 and 24-25, element 112).

Regarding claim 23, Genov '670 teaches the transporting apparatus as claimed in claim 1, wherein the robot comprises a body which is horizontally rotatably fixed on said horizontal support table, said horizontally rotating arms including and end which is rotatably fixed to said body of said robot (Fig. 22, unnamed portion above 312).

Regarding claim 24, Genov '670 teaches the transporting apparatus as applied to claim 1 above, wherein the horizontal support table is formed on a first side of the pair of upright support members, and the horizontally rotating arms are extendable between the pair of upright support members to take up the plate on a second side of the pair of upright support members which is opposite the first side, and to transport the plate between the pair of upright support members to the first side of upright support members.

It is noted that Genov '670 teaches four upright support members. Further, it is noted that the horizontally rotating arms taught by Genov '670 are extendable between

any two of the four upright supports on different horizontal plane (+Z axis). That is, the rotating arm is extendable in a horizontal plane that is above the highest horizontal plane occupied by the support members.

Regarding claim 25, Genov '670 teaches the transporting apparatus as claimed in claim 24, further comprising a movable table (Fig. 25, element 112) for horizontally moving the pair of upright support members, the pair of upright support members being fixed to the movable table being formed on the first side of the pair of upright support members.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Genov '670 as applied to claim 1 above, and further in view of Genov '741 (United States Patent No. US 6,489,741 B2).

Regarding claims 1-7, Genov '741 teaches a robot motion compensation system, the system comprising: a pair of upright support members (Fig. 8, elements 37 and 39) standing at a predetermined interval; at least one horizontal support table (Fig. 8, element 36) liftably cantilevered on the pair of upright support members; a tilt adjuster including a tilt table formed on the horizontal support table (Fig. 1, unnamed element disposed between element 16 and element 16); lift driver (Fig. 8, element 40) for lifting the horizontal support table vertically; a robot (Fig. 8, element 34) placed on the tilt table and having horizontally rotating arms for taking up and transporting the plate (Fig. 8, element 32); the tilt adjuster further comprising a plurality of motors for tilting the table by moving at least one motor (Fig. 8, element 41) at a different angular velocity than one or more other motors (Fig, 8, element 43) thereby changing an angle of the of the

robot placed on the horizontal support table with respect to a horizontal plane (Fig. 7) a deflection compensator for compensating a deflected amount in a vertical direction of the rotating arms and a deflected amount of end effectors provided at respective ends of the rotating arms for taking up and transporting the plate (Fig. 8, element 35) wherein the deflection compensator compensates the deflected amounts of said rotating arms and said end effector when the end effectors take up the plate (column 3, lines 24-57; column 5, line 54 through column 6, line 5) wherein the deflection compensator further comprises an implied information storing device capable of storing information indicative of deflected amounts in the vertical direction at a plurality of predetermined measurement points involved in movement of a reference point on one of the rotating arms and the end effectors, and wherein if the reference point moves to one of the measurement points, then the deflection compensator reads a deflected amount corresponding to a present position from the deflection storing device to compensate the deflected amount (column 3, lines 24-57; column 6, line 34 through column 9, line 2 and column 9, line 51 through column 10, line 22); and wherein the storing device stores a deflected amount due to a self weight and a deflected amount due to holding of the plate, and the deflected amount due to the self weight and the deflected amount due to holding of the plate are used by said deflection compensator to change a compensation amount (column 3, lines 24-57; column 9, lines 8-50).

Genov '741 is silent regarding controlling a tilt angle of the tilt table "with respect to the horizontal support table."

However, independently adjusting the tilt angle of the tilt table with respect to the horizontal support table is very well known in the art as evidenced by Genov '670 above.

It would have been obvious to a person having ordinary skill in the art at the time of the invention to combine the teachings of Genov '741 with the teachings of Genov '670 for the purpose of tilting the tiltable platform about the x axis and the y axis.

8. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Genov '670 as applied to claim 1 above, and further in view of Bacchi et al. (United States Patent No. US 6,275,748).

Regarding claim 11, Genov '670 teaches the transporting apparatus as applied to claim 1 above.

Genov '670 does not explicitly teach a placing position detector including a placing position sensor for detecting passage of the plate held by the end effectors; and a calculator for calculating a displaced amount of the placing position from the reference point based on a detected signal of the placing position sensor; and a displacement compensator for compensating the displaced amount of the placing position based on the calculated displaced amount.

Bacchi et al. teach a material handling system, comprising: at least one horizontal support table (Fig. 15A, element 309) having a robot mounted thereon, the robot arm including rotating arms for taking up and transporting a plate. The system further including a placing position detecting means including a placing position sensor (Figs 12-14, elements 82, 84, 90, 102, 202, 214) for detecting passage of the plate held

by the end effectors; calculating means (Fig. 18B, element 354) for calculating a displaced amount of the placing position from the reference point based on a detected signal of the placing position sensor; and displacement compensating means (Fig. 18B, element 480) for compensating the displaced amount of the placing position based on the calculated displaced amount.

It would have been obvious to a person having ordinary skill in the art at the time of invention to combine the teachings of Genov '670 and Bacchi et al. That is, it would have been obvious to replace the robot taught by Genov '741 with the system taught by Bacchi et al. for the purpose of accurately positioning the robot with respect to a wafer to prevent accidental contact between the robot and the wafer.

Regarding claim 12, Genov '670 teaches the transporting apparatus as applied to claim 11 above.

Bacchi et al. teach the apparatus as applied to claim 11 above, wherein the placing position detecting sensor calculates a displaced amount in an X axis direction, a displaced amount in a Y axis direction and a displaced amount in a rotational direction from the predetermined reference point and the displacement compensator compensates the displaced amounts by moving the end effectors in such a direction that the calculated displaced amounts are cancelled (column 13, line 66 through column 14, line 9).

9. Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Genov '741 (United States Patent No. US 6,489,741 B1).

In regards to claims 15, 18 and 20, Genov '741 teach a method of a transporting apparatus, the method comprising:

based on position data of accessed position of the rotating arms and the end effectors, calculating a moving amount in a horizontal direction, a moving amount in a vertical direction, and driving data of the rotating arms and the end effectors;

moving a robot (Fig. 1, elements 16 and/or 18) based on the moving amount in the horizontal direction and the moving amount in the vertical direction and driving the rotating arms and the end effectors based on the driving data the robot being formed on a tilt table (Fig. 1, element 14) which is formed on a horizontal support table (Fig. 1, element 12); and accommodating deviations associated with deflection of the robot arm by controlling a tilt of the tilt table with respect to the horizontal support table to compensate for deflection (column 1, line 52 through column 2, line 2; column 6, lines 34-54).

While Genov '741 do not explicitly teach "reading from a storing device deflection data of the rotating arms and the end effectors which are extended, and compensation data calculated and stored in advance based on the deflected amount and compensating for the deflected amount based on the read compensation data by controlling a tilt angle of the tilt table with respect to the horizontal support table to compensate for deflection in the rotating arms."

However, Genov '741 teach a computer readable medium containing a program which is executed to control motor positions in accordance with a current position, a desired position, and an inverse kinematics equation (column 12, lines 1-56).

It would have been obvious to a person having ordinary skill in the art at the time of invention to read the kinematics equation from the computer readable medium for the purpose of execution. Further, it would have been obvious to the person to store the kinematics equation (applicants' "calculated compensation data") prior to execution for the purpose of accommodating deviations associated with a deflection of the robot arm by executing a program, including said kinematics equation, on a microprocessor.

In regards to claims 16 and 17, Genov '741 teach the transporting control method as claimed in claim 15, wherein said compensating the deflected amount comprises adjusting a tilt angle (Fig. 5, elements 24 and 24' column 3, lines 1-15) of the robot based on the compensation data thereby to compensate the deflected amount (column 3, lines 22-32).

Regarding claim 19, Genov '741 teach the transporting control method as applied to claim 18 above, wherein the defection depends on whether the plate is held (column 1, lines 37-51)

In regards to claim 21, Genov '741 teach the transporting control method as claimed in claim 15, further comprising detecting a placing position of the plate held by the end effectors; comparing the placing position and a predetermined reference placing position to calculate a displaced amount; and performing operational control to compensate the displaced amount (column 5, line 41 through column 6, line 31).

In regards to claim 22, Genov '741 teach the transporting control method as claimed in claim 21, wherein the displaced amount in said comparing the placing position and said predetermined reference placing position includes a displaced amount

in a X axis direction, a displaced amount in a Y axis direction and a displaced amount in a rotational axis direction from the reference placing position, and wherein the operational control in said performing operational control is performed to compensate each of the displaced amounts in said comparing the placing position and said predetermined reference placing position (column 5, line 24 through column 6, line 54).

Allowable Subject Matter

The examiner notes that claims 2 and 23 would be allowable if combined with all of the elements as presently recited in any parent claim(s) along with language requiring the arm pass between the support members in both the horizontal and vertical planes. See the applicants' Fig. 2, elements 12 and 22. See also claim 14 which requires element 22 from Fig. 2.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dale Moyer whose telephone number is (571)270-7821. The examiner can normally be reached on Monday through Thursday from 10AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi H. Tran can be reached on (571)272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dale Moyer/
Examiner, Art Unit 3664

/KHOI TRAN/
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